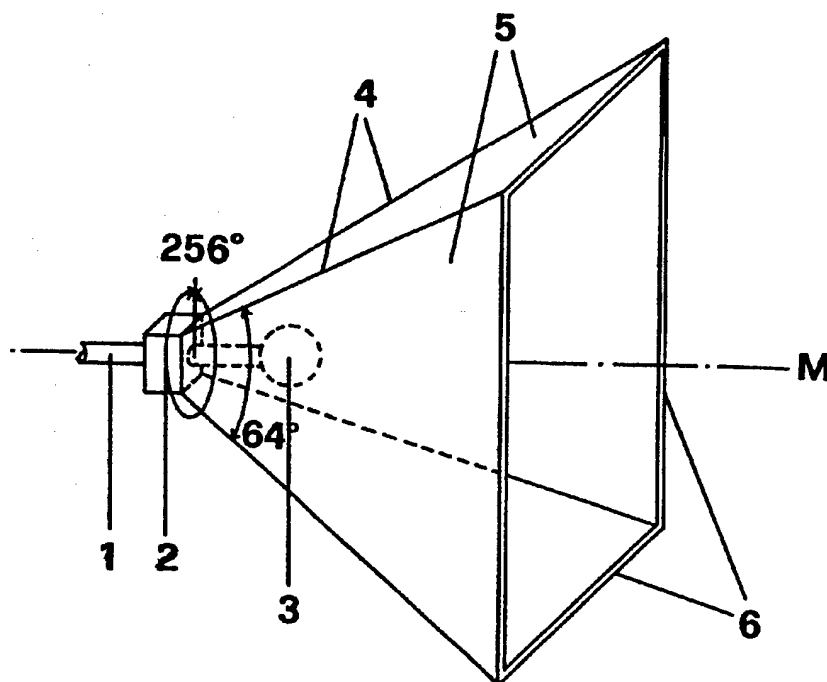




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup>:</b> <b>F21V 7/05, F24C 15/22</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 95/10731</b> <b>(43) International Publication Date:</b> 20 April 1995 (20.04.95)
<b>(21) International Application Number:</b> PCT/IT93/00111 <b>(22) International Filing Date:</b> 15 October 1993 (15.10.93)  <b>(71)(72) Applicant and Inventor:</b> DONATI, Sesto, Severino [IT/IT]; Viale Martiri, 61, I-41026 Pavullo nel Frignano (IT).  <b>(74) Agent:</b> MASCIOLI, Alessandro; A.N.D.I. - Associazione Nazionale Degli Inventori, Via Urbana, 20, I-00184 Roma (IT).		<b>(81) Designated States:</b> JP, US, European patent (AT, BE, CH, DE, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** PYRAMIDAL REFLECTOR HAVING A RADIATION SOURCE ON ITS AXIS



**(57) Abstract**

The reflector device comprises an internal structure having a regular specular pyramidal shape (4), consisting in a plurality of isosceles triangles (5), so as to show at the basis of said pyramid a regular polygon shape with three or more sides (6), said triangles (5) having a sum of the vertex angles of about 256° and a constant inclination of about 32° with respect to the central axis (M) where the light or heat source (3) is provided, so as to produce a multipolar, not dazzling reflexion.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

## Pyramidal reflector having a radiation source on its axis

The present invention concerns a reflector device having an internal structure in the shape of a regular pyramid, whose specular surfaces consist of isosceles, equal triangles, with a light or heat source provided onto the central median axis.

It is well known that there are reflectors having different shapes, provided with curve specular structures like parts of spheres, paraboloids, ellipsoids and others, having the purpose of concentrating the light in dazzling beams.

It is the aim of the present invention to realize a reflector device that emits a homogeneous and wide, concentrated but not dazzling light flow.

The aim set forth is reached by means of the device according to the present invention, comprising an internal specular surface having the shape of a regular pyramid consisting of a plurality of isosceles triangles so as to have at the basis of said pyramid a shape of a regular polygon; the sum of the angles at the vertex of said triangles is of about  $256^\circ$  and the inclination is constant

- about  $32^{\circ}$  - with respect to the central axis, where the light or heat source is provided, so as to produce a multipolar and not dazzling reflection.

For increasing the light concentration and efficiency, the specular surfaces of said isosceles triangles may be slightly concave instead of being plane.

The advantages of the device according to the present invention mainly consist in:

- a high light and heat efficiency when compared to the known devices, with a consequent saving of energy;
- a wide lighting angle;
- it may be applied to practically any kind of light, in fixed systems or on vehicles;
- the possibility of using linear or tubular light sources, with a series of reflectors;
- the possibility of miniaturizing said device for pocket brands and similar.

The present invention will be explained more in detail hereinbelow according to the enclosed drawings, in which two embodiments are shown.

Figures 1 and 2 show an axonometric and transparent view of two variants of the reflector device with an internal structure in the shape of a regular pyramid having

respectively a square and octagonal basis, and with a light or heat source on the central median axis.

The enclosed figures show a reflector device with an internal structure in the shape of a regular pyramid, having a square or a polygon basis with a plurality of sides, comprising:

- a rod 1, fixed or sliding along the median axis M, for supporting the light source 3 in central position;
- a sleeve 2 through which said rod 1 passes, connected to the structure 4 of the reflector;
- a structure 4 of the reflector having the shape of a regular pyramid, consisting of a plurality of isosceles specular triangles 5, and the angles at the vertex, in correspondence with said sleeve 2, reach a sum of  $256^\circ$  when they are inclined of  $32^\circ$  with respect to the median axis M; said inclination remains constant even if the number of said isosceles triangles, and therefore the base polygon of said pyramidal shape - side 6 - varies;
- a light or heat source 3, placed at the centre of the pyramidal shape onto said median axis M, so as to determine a multipolar emission due to the reflexion onto said isosceles specular triangles 5.

Of course, in possible variants of the present invention the number of the sides 6 of said base polygon and therefore the number of said isosceles triangles 5 and the

pyramidal shapes of the structure 4 may change from three to any other number, maintaining the regular structure of the base polygon and the sum of the angles of the vertex of the isosceles triangles 5, corresponding to about  $256^\circ$ , so as to be each  $64^\circ$  in case of a square pyramidal structure and  $32^\circ$  in the octagonal structure.

## CLAIMS

1. A reflector device with an internal structure in the shape of a regular pyramid and a light or heat source onto the central median axis, characterized in:
  - a rod (1), fixed or sliding along the median axis (M), for supporting the light source (3) in central position;
  - a sleeve (2) through which passes said rod (1), connected to the structure (4) of the reflector;
  - a structure (4) of the reflector, in the shape of a regular pyramid, consisting of a plurality of isosceles, specular triangles (5), having angles at their vertex - in correspondence with said sleeve (2) - showing up a sum of about  $256^\circ$  when inclined and therefore of about  $32^\circ$  with respect to the median axis (M), said inclination remaining constant even if the number of said isosceles triangles varies and therefore also the base polygon of said pyramidal shape of side (6) varies;
  - a light or heat source (3), provided at the centre of the pyramidal shape onto said median axis (M), so as to determine, due to the reflexion onto said isosceles specular triangles (5), a multipolar emission.
2. A device according to claim 1, characterized in said specular surfaces of said isosceles triangles (5) being slightly concave so as to determine an increase of the light concentration and in the efficiency.

3. A device according to claim 1, characterized in variations from three to any number of the sides (6) of the base polygon of the pyramidal shape (4), and therefore of the number of said isosceles triangles (5), maintaining the regular structure of the base polygon and the sum of the angles at the vertex of the isosceles triangles (5) at  $256^{\circ}$ , so as to be each of  $64^{\circ}$  with a square pyramidal structure and of  $32^{\circ}$  with the octagonal structure.



1 / 1

FIG.1

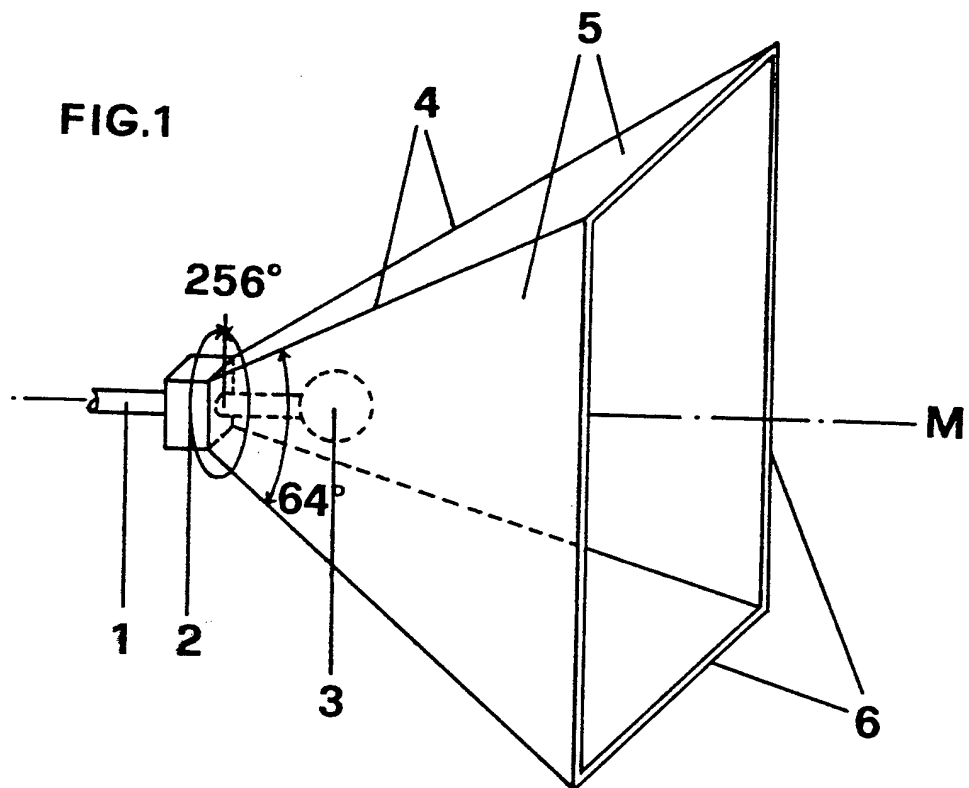
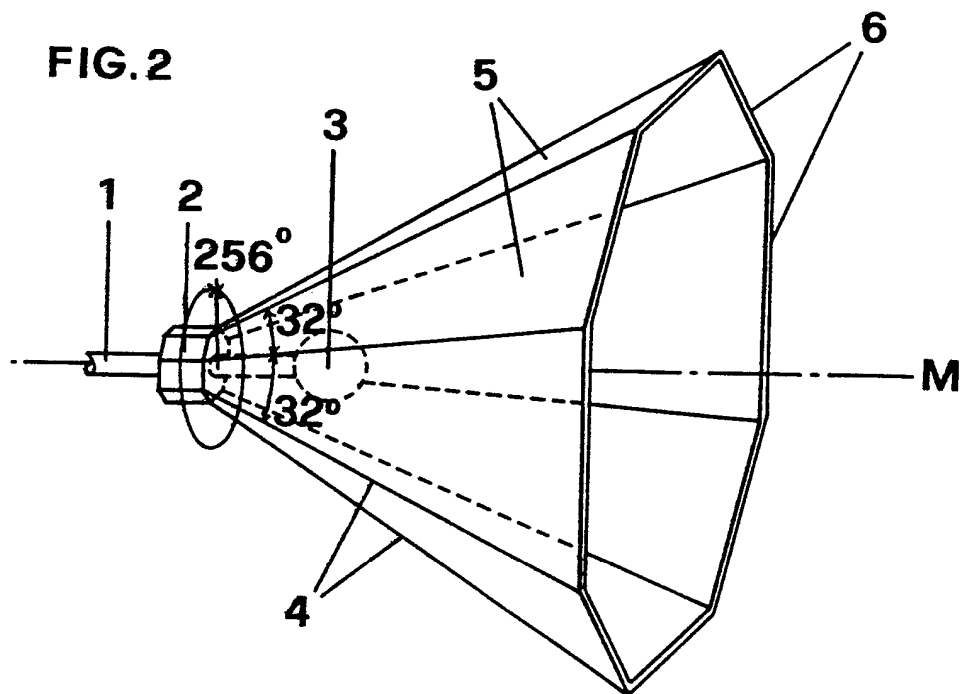


FIG. 2



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 93/00111

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 F21V7/05 F24C15/22

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 F21V F24C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB,A,2 026 707 (EASTMAN KODAK COMPANY) 6 February 1980 see page 2, line 103 - page 3, line 15 see page 4, line 19 - line 23 see page 4, line 43 - line 51 see page 5, line 121 - line 129; figures 1A,3 ---	1,3
A	GB,A,440 487 (DE MEY) 23 December 1935 see page 2, line 45 - line 61; figures 1-4 ---	1
A	BE,A,459 203 (N.V. PHILIPS' GLOEILAMPENFABRIEKEN) 4 January 1946 see page 2, line 50 - line 56; figure 1 -----	2

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

15 July 1994

Date of mailing of the international search report

25.07.94

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Martin, C

**INTERNATIONAL SEARCH REPORT**

information on patent family members

International Application No

PCT/IT 93/00111

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A-2026707	06-02-80	US-A- 4264947 CA-A- 1135406	28-04-81 09-11-82
GB-A-440487		NONE	
BE-A-459203		NONE	